




# Atypical longitudinal self-inflicted incised wounds as a cause of death in an ecstasy user

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## Abstract

A 32-year-old chronic drug abuser was found dead at the entrance to his home, covered in blood. Pools of blood, bloody footprints and bloodstains were found across the apartment. A double-edged razor was recovered from the scene. Autopsy revealed multiple incised wounds: two on the palmar aspect of both forearms (37 cm and 33 cm long, oriented longitudinally). The cuts extended into the subcutaneous adipose tissue, muscles and blood vessels. There was an additional 30 cm cut extending across the middle of the torso anteriorly and two more cuts on the anteromedial aspect of the lower legs, set symmetrically (about 23 and 25 cm long). These three cuts were more shallow than the upper extremity wounds. No hesitation wounds were identified. Toxicological analysis identified MDMA (ecstasy). The cause of death was exsanguination. The deceased has been using ecstasy for the previous five years and had a history of inpatient psychiatric treatment due to psychosis with delusions and hallucinations. These self-inflicted incised wounds had many atypical features: location (torso, legs and arms), longitudinal orientation and symmetrical distribution, absence of hesitation injuries, use of both dominant and non-dominant hand. The absence of previous suicide attempts and suicide note suggest that these self-inflicted injuries were not planned beforehand, but were abrupt. We hypothesize that this injury pattern is associated with both acute and chronic effects of MDMA.

**Keywords** Autopsy · Suicide · Incisions · Self-inflicted wounds · Longitudinal incisions · Ecstasy

## Case report

A 32-year-old man was found down at the entrance to his home, covered in blood and wearing only socks (Fig. 1a, b). Pools of blood and bloodstains were noticeable on the bathroom floor (Fig. 1c, d). A double-edged razor blade was recovered from the scene (Fig. 1e). Bloodstains, irregular pools of blood and bloody footprints were found across the apartment (Fig. 1f) and the balcony (Fig. 1g). Autopsy was performed three days after the body was found.

The deceased was 174 cm tall and weighed 52 kg (Fig. 2a). A total of five incised wounds were identified. A 30 cm cut extended across the anterior torso, oriented longitudinally, almost perfectly matching the anterior median line, extending into the subcutaneous adipose tissue (Fig. 2b). Two additional cuts were located along the

anteromedial aspect of lower legs, symmetrically oriented along the long axis of the extremity and measuring 23 cm and 25 cm in length. These cuts extended through subcutaneous adipose tissue down to the muscle fascia (Fig. 2c, d). Two additional cuts were identified along the palmar aspect of bilateral upper extremities, extending from the lower part of the upper arm to just above the wrist. These cuts were oriented parallel to the long axis of the extremities, set symmetrically and measured about 37 cm and 33 cm in length. The wounds extended through the subcutaneous fatty tissue, muscle and blood vessels (Fig. 2e, f). Complete transection of the right ulnar artery was identified. Superficial cuts were present on the fingertips of both hands (Fig. 3a, b), suggesting that both hands were used to hold the double-edge razor blade. Several linear skin abrasions were apparent on the anterior aspect of the torso and the right thigh. No obvious hesitation wounds were found. Other autopsy findings included generalized anemia of the viscera and patchy sub-endocardial hemorrhages, suggesting that the cause of death was exsanguination. Blood samples from the femoral vein, vitreous humor and urine (GC–MS and LC–MS/MS) were

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**Fig. 1** **a** and **b** The body of the deceased in front of the entrance door. **c** and **d** Blood traces in the bathroom. **e** A double-edged razor blade on the bathroom floor. **f** and **g** Bloodstains, irregular pools of blood and bloody footprints



positive for 3,4-methylenedioxy-methamphetamine (MDMA or ecstasy) with concentrations of 0.1 mg/L, 0.15 mg/L and 13.72 mg/L, respectively.

The deceased was a disc jockey with a five-year history of ecstasy use. His past medical history was also significant for inpatient psychiatric treatment for psychosis. The deceased was “anxious” and has “not been feeling well” over the last month of his life. He was right-handed, did not have a history of prior suicide attempts and he did not leave a suicide note.

## Discussion

Many incised and stab wounds are self-inflicted, motivated by self-destruction, associated mental illness or inflicted deliberately with the aim of obtaining a secondary gain [1].

Historically, use of sharp force was a common method of suicide. More recently, it became relatively rare. This may be due to associated pain, anticipated bloody scene and the need for considerable force and anatomical knowledge [2]. In a typical suicide case the wound is typically away from the sensitive areas such as genitalia, lips, and eyes, and away from the bones. Its location is further dictated by the accessibility of the area and the victim’s anticipation of the position of the heart or major blood vessels [3–5]. Hesitation wounds are superficial stabs or cuts, that usually penetrate only the skin and tend to be parallel and grouped in clusters. These wounds are often seen in close proximity to the fatal wound. They are typical of self-infliction [6, 7] and are present in half of the cases [7].

Suicidal sharp force injuries are not commonly found in the lower extremities [7], and the most common locations of suicidal incised wounds are wrist, elbow and neck [2].

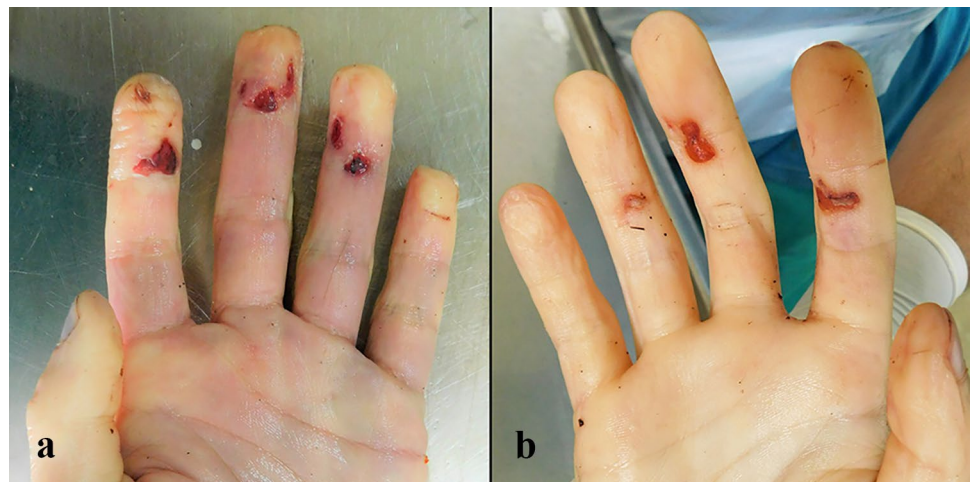
**Fig. 2** **a** Gross appearance of the body. **b** Torso. **c** and **d** Lower extremity injuries. **e** and **f** Upper extremity injuries



Typically, these wounds are not located on the dominant upper extremity [7] and tend to be oriented horizontally, although wounds parallel to the long axis of the arm have been described [2]. Longitudinal incised wounds at the dorsal aspect of arms and forearms have already been reported in sharp force suicides, since the exact location of the major vessels and other vital structures is not a part of common knowledge [8, 9]. With longitudinal orientation of the incised wounds, there are fewer injuries to tendons and nerves, however arterial injuries appear to be more common [10].

There were many atypical wound features in this case: involvement of the torso (Fig. 2b) and lower legs (Fig. 2c, d), exclusively longitudinal orientation (Fig. 2), absence of hesitation injuries, involvement of dominant and non-dominant extremities, and use of both hands (Fig. 3). The bloodstain pattern spread across a wide area indicated that a major artery had been injured. We utilized an arterial perfusion technique [11] which allows detection of the arterial injury without risking unintentional vessel damage during dissection. Subclavian arteries were cannulated and perfused with diluted ink, revealing a transection of the right ulnar artery.

**Fig. 3** **a** and **b** Superficial incised wounds and excoriations on the fingertips of both hands



Most people who commit suicide have a psychiatric diagnosis [3, 12], and sharp force is mainly used by men [13]. Psychoactive substance abuse is the second most common risk factor in such cases [14]. MDMA has stimulant and hallucinogenic effects [15, 16]; it causes disinhibition, enhances sensory perception and users typically seek increased stimulation through loud music and light [15]. MDMA adverse effects include depression, hallucinations [17] and psychosis in long-term users [15]. The deceased was a disc jockey who was diagnosed with psychosis in the past. Both delusions and hallucinations were part of his presentation, and he was “very anxious and felt unwell” prior to his death.

The atypical localization of the self-inflicted cuts, their atypical longitudinal and symmetrical orientation, absence of hesitation injuries, use of both dominant and non-dominant hand, absence of previous suicide attempts and suicide note, suggest that these self-inflicted injuries were not planned beforehand. They appeared to be abrupt, and likely related to both acute MDMA intoxication and the effects of its chronic use.

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## References

1. Saukko P, Knight B. *Knight's Forensic pathology*. 4th ed. Boca Raton: CRC Press; 2016.
2. Karger B, Niemeyer J, Brinkmann B. Suicides by sharp force: typical and atypical features. *Int J Legal Med*. 2000;113:259–62.
3. Fukube S, Hayashi T, Ishida Y, Kamon H, Kawaguchi M, Kimura A, et al. Retrospective study on suicidal cases by sharp force injuries. *J Forensic Leg Med*. 2008;15:163–7.
4. Austin AE, Guddat SS, Tsokos M, Gilbert JD, Byard RW. Multiple injuries in suicide simulating homicide: report of three cases. *J Forensic Leg Med*. 2013;20:601–4.
5. Terranova C, Doro L, Zancaner S, Zampini T, Mazzarolo C, Bonvicini B, et al. Criminological and medico-legal aspects in homicidal and suicidal sharp force fatalities. *J Forensic Sci*. 2020;65:1184–90.
6. Byard RW, Klitte A, Gilbert JD, James RA. Clinicopathologic features of fatal self-inflicted incised and stab wounds: a 20-year study. *Am J Forensic Med Pathol*. 2002;23:15–8.
7. De-Giorgio F, Lodise M, Quaranta G, Spagnolo AG, d'Aloja E, Pascali VL, et al. Suicidal or homicidal sharp force injuries? A review and critical analysis of the heterogeneity in the forensic literature. *J Forensic Sci*. 2015;60:S97–107.
8. Brunel C, Fermanian C, Durigon M, de la Grandmaison GL. Homicidal and suicidal sharp force fatalities: autopsy parameters in relation to the manner of death. *Forensic Sci Int*. 2010;198:150–4.
9. Viel G, Cecchetto G, Montisci M. An unusual case of suicide by sharp force. *J Forensic Sci*. 2009;184:e12–5.
10. Kisch T, Matzkeit N, Waldmann A, Stang F, Krämer R, Schweiger U, et al. The reason matters: Deep wrist injury patterns differ with intentionality (accident versus suicide attempt). *Plast Reconstr Surg Glob Open*. 2019;7:e2139.
11. Langlois NE, Byard RW. Arterial perfusion – a useful technique for evaluating incised wounds. *J Forensic Sci*. 2018;63:1282–3.
12. Wasserman D, Rihmer Z, Rujescu D, Sarchiapone M, Sokolowski M, Titelman D, et al. The European Psychiatric Association (EPA) guidance on suicide treatment and prevention. *Eur Psychiatry*. 2012;27:129–41.
13. Massaro L. Unusual suicide in Italy: criminological and medico-legal observations—a proposed definition of “atypical suicide” suitable for international application. *J Forensic Sci*. 2015;60:790–800.
14. Karakasi MV, Nastoulis E, Kapetanakis S, Vasilikos E, Kyropoulos G, Pavlidis P. Hesitation wounds and sharp force injuries in forensic pathology and psychiatry: multidisciplinary review of the literature and study of two cases. *J Forensic Sci*. 2016;61:1515–23.
15. Karch SB. *Karch's pathology of drug abuse*. 4th ed. Boca Raton, London, New York: CRC Press; 2009.
16. Madea B, editor. *Handbook of forensic medicine*. Chichester: Wiley Blackwell; 2014.
17. Dettmeyer R, Verhoff M, Schuetz H. *Forensic pathology – fundamentals and perspectives*. Heidelberg, New York, London: Springer; 2014.

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